tected, as it were, from another crossing over. This relation is illus-
trated in the diagram (fig. 7). If crossing over occurs at some point
between two pairs of factors a and b indicated on the diagram, the next
crossing over point of the chromosome would, if it occurred at all, lie
at some distance away, rather than near by. This possibility can be
tested in a case where several known points are present in a pair of
chromosomes. If in such a case we determine how often crossing over
occurs between A and a in general and then determine how often it
occurs between A and a in those cases where it is known to have taken
place between a and b, we find an enormous decrease in the number
of times it occurs between A and a when at the same time it has
occurred between a and b. In general one may say that crossing over
at any level interferes with crossing over in the region of each side of
that level.

Conclusions. The chromosomes not only furnish a mechanistic ex-
planation of Mendelian heredity, but in the case of Non-disjunction
and in the case of the point by point correspondence between the Link-
age Groups and the chromosomes, furnish a *verifiable* explanation of the
results. In the case of Crossing-over and of Interference the chromo-
somes give us the only objective explanation of the results that has
been as yet offered.

RESEARCHES ON THE CHEMICAL AND MINERALOGICAL COMPOSITION OF METEORITES

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The primary motive of these investigations was to test the authentic-
ity of numerous reported occurrences of certain minor constituents,
such as antimony, arsenic, gold, lead, tin, tungsten, uranium, zinc, etc.,
and incidentally to formulate the analyses in such a way that the results
might be made comparable with those of terrestrial rocks. Upwards
of twenty meteorites were subjected to searching chemical analyses,
with the particular end in view stated above. The results were in part
confirmatory and in part contradictory. In none of the samples tested,
either metallic or stony, could any traces be discovered of antimony,
arsenic, gold, lead, tin, tungsten, uranium, or zinc. The presence in
traces of platinum, palladium, iridium, ruthenium, and vanadium was,
however, proved beyond apparent question, ruthenium being noted for
the first time, and vanadium having previously been reported but once.

Attention was also directed toward the possible occurrence of barium, strontium, and zirconium, particularly in the feldspathic forms. Only. negative evidence was obtained. This is not regarded as conclusive, but the investigation was hampered by a paucity of material.

Incidental to the work, a determined effort was made to ascertain to what of the minerals these minor constituents should be relegated. These results have thus far been only partially successful. It is evident that the platinum, palladium, and ruthenium, and perhaps the vanadium as well, are constituents of the metallic portions. The same is true of at least a part of the nickel and cobalt, although determinations made on the silicate portions, after most careful work to remove all of the native metal, still showed traces of both of these elements, indicating that they were also constituents of the pyroxenes or olivines as is often the case in terrestrial rocks.

In attempting to ascertain the source of the phosphorus in the silicate portion, unexpected results were developed, the presence being shown of a phosphate of lime differing from normal apatite in being optically biaxial and with a somewhat lower index of refraction. This, together with the apparent widespread occurrence of the mineral oldhamite, a sulphide of calcium, as indicated by aqueous solutions, has been made the subject of a special paper in the May number of these PROCEEDINGS.

A table comprising fifty-nine selected analyses of stony meteorites was given, twelve of which were made during the course of the investigations here being considered, others being taken from published descriptions by other workers. This table, too large for reproduction here, will appear with the extended report in some future publication. The average composition of the stony meteorites, as shown by fifty-three of the analyses, is given in column I of the following table. In column II is shown, for purposes of comparison, the average composition of the terrestrial lithosphere as given by F. W. Clarke, while in columns III and IV are the meteoric averages presented in previous papers by the author and Dr. O. C. Farrington respectively.

	I	II	III	IV
SiO_2............	38.68	59.85	38.732	39.12
TiO_2............	0.18[1]	0.73	.....	0.02
SnO_2............	none			0.02
ZrO_2............	none	0.03		
Al_2O_3............	2.88	14.87	2.7333	2.62
Fe_2O_3............		2.63	} 0.835 {	0.38
Cr_2O_3............	0.47[2]	0.05		0.41
V_2O_3............	trace	0.02		
Fe............	11.98		11.536	11.46
Ni............	1.15[3]		} 1.312 {	1.15
Co............	0.07[4]			0.05

	I	II	III	IV
FeO	14.58	3.35	16.435	16.13
NiO	0.48[5]	0.03		0.21
CoO	0.06[6]			
CaO	2.42	4.81	1.758	2.31
BaO	none	0.10		
MgO	22.67	3.77	22.884	22.42
MnO	0.29[7]	0.09	0.556	0.18
SrO	none	0.04		
Na_2O	0.87[8]	3.29	0.943	0.81
K_2O	0.21[9]	3.02	0.328	0.20
Li_2O	trace	0.01		
H_2O(Ign.)	0.75[10]	2.05		0.20
P_2O_5	0.26[11]	0.25		0.03
S	1.80[12]	0.10	1.839	1.98
Cu	0.014[13]			
C	0.15[14]	0.03		0.06
Cl	0.08[15]	0.06		
F	?	0.10		
CO_2	?	0.70		
SO_3		0.02		
Ni, Mn	}			0.02
Cu, Sn	}			
	100.04₄	100.00	100.00	99.82

[1] Average of 46 determinations
[2] Average of 42 determinations.
[3] Average of 50 determinations.
[4] Average of 41 determinations.
[5] Average of 19 determinations.
[6] Average of 6 determinations.
[7] Average of 33 determinations.
[8] Average of 49 determinations.
[9] Average of 44 determinations.
[10] Average of 15 determinations.
[11] Average of 44 determinations.
[12] Average of 51 determinations.
[13] Average of 16 determinations
[14] Average of 8 determinations.
[15] Average of 5 determinations.

The detailed results of these investigations on the chemical and mineralogical constituents of meteorites begun in 1912 under a grant from the National Academy will be printed as a Memoir in the series of *Memoirs of the National Academy*.

ON THE REPRESENTATION OF ARBITRARY FUNCTIONS BY DEFINITE INTEGRALS

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Let $f(x)$ be any function of the real variable x defined and with $|f(x)|$ integrable throughout the interval (a, b) and having limited total fluctuation in the neighborhood of the particular point $x = \alpha$ $(a < \alpha > b)$. Then, if $\varphi(n, x - \alpha)$ be a function of the parameter n and of $x-\alpha$ satisfying certain well known conditions the integral

$$I_n(\alpha) = \int_a^b f(x)\, \varphi(n, x - \alpha)\, dx \qquad (1)$$